WETLAND MITIGATION SITE MONITORING REPORT
FAP 313 (U.S 34) Henderson County

SUMMARY

Based on observations made during the 2000 season, the following is a summary that relates the likelihood that the compensation site will meet each goal within the 5-year monitoring period. The goal, objective, and performance standards follow those outlined in the IDOT monitoring request (January 15, 1999).

Project goal : To create a 10.13 acre (4.1 ha) emergent wetland.

Hydrophytic vegetation, hydric soils, and wetland hydrology are currently present. Water interspersion was moderate at the time of the survey. The site currently meets the required floristic quality index (FQI) but not the mean coefficient of conservatism (mean C). The native mean wetness coefficient (native mean W) is less than zero and therefore surpasses the performance standard. Eighty-five percent of the plant species are hydrophytic. Two of the four most dominant species, *Typha angustifolia* and *Echinchloa crusgalli,* are non-native. The relative importance value of native species decreased slightly since last year. Planted tree seedling survival was good.

INTRODUCTION

This report details monitoring of the site restored for wetland impact mitigation for FAP 313 (U.S. 34) in Henderson County. Site location is NE1/4, NE 1/4, SW 1/4, sec. 34, T.10N. - R.6W. (U.S. Geological Survey (USGS) topographic map, Burlington 7.5-minute quadrangle). It is found in the USGS Upper Mississippi Hydrologic Unit 07080104 for the Mississippi River tributaries from New Boston to Warsaw. This site was formerly wet prairie (Plocher *et al.*, 1995), was converted to farmland, and had been fallow for an estimated five years prior to excavation in September 1997 for wetland mitigation. Apparently, eight obligate herbaceous wetland species were planted in the wetland portion of the site. Four species of tree seedlings were also planted along the edge (perimeter) of the site. Monitoring is required for five years; this is the second year. On-site monitoring in 2000 was conducted on August 16th.

This report discusses the goals, objectives, and performance standards for the mitigation project, the methods for monitoring the site, monitoring results, a summary, and recommendations based on results. Methods and results are discussed by performance standards for each goal. The monitoring plan was not previously submitted.

Goals, Objectives, and Performance Standards

Proposed goals for the mitigation project are those indicated in the IDOT monitoring tasking order (January 15, 1999) and are listed on the following pages.

Project goal: The created wetland community should be a 10.13 acre (4.1 ha) emergent wetland.

Objective: A high quality marsh will develop through natural recolonization and planting of obligate wetland species.

Performance standards:

1. The entire created wetland (10.13 acres) should satisfy the three criteria of the federal wetland definition:

   a) Predominance of hydrophytic vegetation. More than 50% of the dominant plant species must be hydrophytic.

   b) Presence of hydric soils. Hydric soil characteristics should be present, or conditions favorable for hydric soil formation should be present at the site.

   c) Presence of wetland hydrology. The compensation area must be either permanently or periodically inundated at averaged depths less then 2 m (6.6 ft) or have soils that are saturated to the surface for at least 12.5% of the growing season.

2. By the end of the fifth year, a native mean coefficient of conservatism value (native mean C value) of greater than or equal to 3.5 must be achieved, measured over the entire mitigation area. The native mean C value must increase each successive year.

3. By the end of the fifth year, the native floristic quality index value (native FQI) must be greater than or equal to 20 as measured over the entire mitigation site. The native FQI must increase each successive year.

4. By the end of the fifth year, the native mean wetness coefficient (native mean W) must be less than or equal to 0 in the wetland community.

5. The relative importance value of total native plants (RIV_n) must increase each successive year.

6. By the end of the fifth year, none of the three most dominant plant species in any of the wetland community zones may be non-native or weedy species, including, but not limited to *Phragmites australis*, *Poa compressa, Poa pratensis, Lythrum salicaria, Salix interior, Echinochloa crusgalli* or *Phalaris arundinacea,* unless otherwise indicated on the approved mitigation plan.

7. At the end of the five year monitoring period, at least 25% of the created wetland should be covered by hydrophytic vegetation. The interspersion of water and vegetation should be moderate to high. An open body of water surrounded by a continuous band of fringe vegetation is considered to have a low

degree of interspersion, while a checkerboard of open water would have a high degree of interspersion.

8. The planned wetland community should be dominated by tall graminoid plants. Woody vegetation should account for less than 30% of the aerial cover.

9. A 75% survival rate shall be maintained each year for all tree species planted within the wetland mitigation site (Department of the Army, Corps of Engineers permit number: CENR-RD-328500).

METHODS

Performance standard 1

a) Predominance of hydrophytic vegetation

The method for determining dominant hydrophytic vegetation at a wetland site is described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987) and further explained in the *Federal Manual for Identifying and Delineating Jursidictional Wetlands* (Federal Interagency Committee for Wetland Delineation, 1989). It is based on areal coverage estimates for individual plant species. Each of the dominant plant species is assigned its wetland indicator status rating (Reed 1988). Any plant rated facultative or wetter (i.e., FAC, FAC+, FACW, and OBL) is considered a hydrophyte. A predominance of vegetation in the wetland plant community exists if more than 50% of the dominant species present are hydrophytic.

b) Occurrence of hydric soils

To monitor hydric soil development, the soil was sampled in 1999 and verified in 2000. Soil profile morphology, including horizon color, texture, and structure was described at representative points throughout the site. Additionally, the presence, type, size, and abundance of redoximorphic features were recorded. In the absence of hydric soils indicators, hydrologic data can be used to confirm that conditions favorable for hydric soil formation persist at the site.

c) Presence of wetland hydrology

The method for determining the presence of wetland hydrology at a site is described in the *Corps of Engineers Wetland Delineation Manual* (Environmental laboratory, 1987). Hydrologic indicators may include, but are not limited to, drainage patterns, drift lines, sediment deposits on leaves, watermarks on trees, visual observations of saturated soils, ad visual observation of inundation. Monitoring well data from the Illinois State Geological Survey (Fucciolo *et al.* 1999) was also used to determine the seasonal depth to the water table.

Performance standards 2, 3, 6 and 8

Plant community quality and composition

The Floristic Quality Assessment (Taft *et al.*, 1997) was utilized to determine the floristic quality and nativity of the plant communities at the site. This method aids in identifying natural

areas, monitoring restored and created wetlands, and comparing the quality of vegetation at different sites. First, each plant species native to Illinois is assigned a conservatism coefficient (C) ranging from zero to 10. Individual conservatism coefficients reflect the probability that a particular taxon correlates with anthropogenic disturbances. Plant species assigned zero tend to have low affinities for natural areas and those assigned 10 have very high affinities. A higher quality site will have more species with high conservatism coefficients. When a complete species list is compiled for a site, the mean coefficient value (mCv) and a site floristic quality index can be calculated as follows:

N= the number of native plant species

$MCv = \Sigma C/N$

$FQI = mCv \sqrt{N}$

Sites with FQI values less than 10 indicate low natural quality. Sites with FQI values of 20 or more possess some evidence of natural character and may be considered environmental assets.

Planted tree seedling survival

In the fall of 1999, 500 each of the following four tree species were planted: *Quercus bicolor* (swamp white oak), *Quercus palustris* (pin oak), *Carya illinoensis* (pecan), and *Carya laciniosa* (shell bark hickory) (letter from IDOT, 10 February 2000). All individual trees were counted by following rows (where present and distinguishable). Otherwise, trees were counted by following a regular pattern across the areas of the site that were planted (along the perimeter).

Performance standards 4 and 7

Characterization and extent of hydrophytic vegetation

In addition to being assigned a Coefficient of Conservatism, each species is also assigned a mean wetness coefficient based on the National Wetland Category for Region 3 of the U.S. Fish and Wildlife Service (Reed 1998). Plants are designated as obligate wetland (OBL), facultative wetland (FACW), facultative (FAC), facultative upland (FACU), or upland (UPL). Plus (+) and minus (-) signs are added when a plant falls between two of the above categories. For example, FACW+ indicates that a plant is likely to be found in wetter environments than a FACW plant. Likewise, a FACU- suggests that a plant is almost an upland (UPL) species (may be found in slightly higher (drier) areas than FACU). Each category is assigned a numerical value, ranging from -5 for OBL, 0 for FAC, to +5 for UPL. These values were used to determine the mean wetness coefficient (an average of all ordinate wetness values) and the percent of the wetland covered by hydrophytic vegetation.

Performance Standard 5

Relative importance value of native plants

A baseline was established along the long axis near U.S. 34 bearing 75° east of north. The first transect was set approximately 25 m (82 ft) east-northeast of a large silver maple in the southwestern corner of the site, bearing 25° west of north. This transect begins at photo station 1 (marked by a permanent metal stake). Transects were set 30 m (98 ft) apart along the baseline; there were seven transects. Transect length and the number of 0.25 m^2 quadrats (four to seven) per transect was variable because of the shape of the mitigation site. Quadrats were set

25 m (82 ft) apart along the transects. The approximate location of the baseline and transects is indicated on the aerial photo and plan sheet. A total of 39 quadrats were sampled. The aerial cover (indicated by cover class) of each species in the quadrats was recorded using the categories listed in Table 1. Percent cover of plant species was analyzed using cover class mid-points (Table 1).

Sampling and analysis methods are based on standard vegetation sampling procedures (Smith, 1980 and Cox, 1985). Plant species frequency values were determined by dividing the number of plots (quadrats in which an individual species occurred) by the total number of plots sampled (39). Relative importance values for individual species and for combined native (RIVn) and combined non-native (RIVa) were calculated by dividing the sum of relative coverage and relative frequency by two and multiplying by 100: [(RC + RF)/2 *100] = RIV.

Table 1. Cover classes used for quadrat sampling

Cover class	Range of Cover (%)	Midpoint of Range (%)
1	1-5	3.0
2	5-25	15.0
3	25-50	37.5
4	50-75	62.5
5	75-95	85.0
6	95-100	97.5

Photography Stations

We established seven photo stations at representative locations along the perimeter of the wetland mitigation site to document changes in plant community features. Photo station locations are indicated on the enclosed aerial photograph and plan sheet. Photographs are in Appendix E.

RESULTS

Performance standard 1

a) Predominance of hydrophytic vegetation

Dominant plant species for the wetland are shown in Table 2. All of the dominant plant species are obligate wetland species and therefore, are hydrophytic. Also refer to the wetland determination form in Appendix B.

Table 2. Dominant plant species by stratum and wetland indicator status.

Dominant plant species	Indicator Status	Stratum
Echinchloa crusgalli	OBL	herb
Eleocharis acicularis	OBL	herb
Eleocharis obtusa	OBL	herb
Typha angustifolia	OBL	herb

b) Occurrence of hydric soils

In the fall of 1994, the wetland portions of the site had saturated soils within 0.3 m (12 in) of the surface (Plocher *et al.*, 1995). In the 1999 monitoring season, all soils in the excavated area were determined to be hydric; this was verified in 2000. Because the soils were excavated, assumptions were made about the characteristics of the former topsoil. Based on landscape position, morphological characteristics in the lower profile, the Soil Survey of Henderson County (USDA, 1956), and soils data from the Mitigation Site Assessment (Plocher *et al.*, 1995) the Sawmill series (Cumulic Endoaquoll) was present. The mollic epipedon appears to have been removed. An iron depleted matrix is at the surface and contains many redoximorphic concentrations (Table 3). Standing water and saturated soils in a significant portion of the site were also observed.

Table 3. Soil profile description:

Depth	Description
0-10 in	2.5Y 5/1, silty clay with sandy layer, subangular blocky to massive, common to many 7.5YR 5/8 iron masses
10+	impenetrable

c) Presence of wetland hydrology

This site is located in the greater Mississippi River floodplain. Although the site may only flood occasionally, the site is affected directly by the Mississippi through water table fluctuations. Field evidence of wetland hydrology included water scouring, depressional (excavated) landscape, and inundation. Approximately one-third of the site was inundated at the time of the survey in 1999; in 2000, because of a drier year, a slightly smaller portion of the site was inundated.

In 1999, the total area of the created wetland that conclusively satisfied the wetland hydrology criteria was 2.8 ha (6.9 acres) out of a total excavated area of 3.9 ha (9.6 ac) (Fucciolo et al., 1999). In 2000, 2.75 ha (6.8 acres) satisfied the wetland hydrology criteria (Appendix D). Additionally, "surface-water levels measured by the RDS data logger indicated that inundation occurred to an elevation of 157.38 m (516.33 ft) for a duration sufficient to satisfy wetland hydrology criteria" (Carr and Weaver, 2000).

Performance standards 2, 3, 6, 8, and 9

Plant community quality and composition

The performance standard indicates that the goal for the coefficient of conservatism is 3.5 (after 5 years). This was not met in the first or second year. The mean C value, including planted species was 3.0. The FQI for the entire site (including planted herbaceous and tree species) was 24.3. The mean C value and FQI increased since last year (from 2.9 and 21.0, respectively). Without the planted woody and herbaceous species, the mean C is 2.4 and the FQI is 18.6 (compared with 2.2 and 14.5 in 1999).

In 1999, the most dominant species at the site was *Typha angustifolia*, followed by *Eloecharis acicularis*, *Eleocharis erythropoda*, *Elodea canadensis*, and *Echinochloa crusgalli* (in descending order of RIV). This year, the most dominant species at the site was *Eleocharis acicularis* (spike rush). *Typha angustifolia* (narrow-leaved cattail), a weedy, non-native species is the second most dominant. *Echinochloa crusgalli* (barnyard grass),also a non-native species, and *Eleocharis obtusa* (spike rush) are the third and forth most dominant species, respectively. All of these species except *T. angustifolia* are graminoid. Approximately 9.5% of the species are woody including *Acer saccharinum* (silver maple), *Carya illinoensis, Populus deltoides* (cottonwood), *Quercus bicolor, Quercus palustris, Salix amygdaloides* (peach-leaved willow), and *Salix exigua* (sandbar willow). Currently, the combined relative cover of these species is negligible. Trees planted along the perimeter of the site appear to be healthy and are expected to have a good chance of surviving in the long term. Trees identified were *Carya illinoensis, Quercus bicolor,* and *Quercus palustris.* These species are mostly located outside of the wetland (see hydrology section). A few individuals of *Carya laciniosa* were identified with some degree of uncertainty.

Planted tree seedling survival

Table 3. Survival rates of planted tree seedlings

Species	Number planted	Number survived	Survival Rate (%)
Carya illinoensis	500	157	31.0
Carya laciniosa	500	3	0.6
Quercus bicolor	500	263	52.6
Quercus palustris	500	327	65.4
Overall	2000	750	37.5

Average survival for all tree species was 37.5%. The *Quercus* species had higher survival rates than the *Carya* species. It is uncertain whether *Carya laciniosa* was planted or what caused the low survival. Without considering *C. laciniosa*, tree seedling survival would be almost 50%. This is a fairly high survival rate but falls short of the goal of 75%. For the purpose of calculating percent tree survival, it was assumed that 500 of each tree species were planted. However, it seems very unlikely that that many were planted. No dead trees were observed; to suggest that only 37.5% survived (based on calculations) seems misleading.

In general, the planted tree seedlings were 0.3 - 0.9 m (12-36 in) tall and healthy, with some evidence of herbivory. An occasional individual was 1.2 - 1.5 m (48-60 in) tall (most notably, a pecan in the northwest portion of the site). Volunteer species of *Populus deltoides* were abundant while individuals of *Acer saccharinum* occurred occasionally and, rarely, a volunteer *Ulmus americana* (American elm) was observed.

Performance standards 4 and 7

Characterization and extent of hydrophytic vegetation

The excavated area primarily includes two different cover types: marsh in the main central portion (dominated by *Eleocharis acicularis, Typha angustifolia, Echinochloa crusgalli,*

and *Eleocharis obtusa*,), and non-native grassland around the margin (foxtail dominates). Marsh is indicated by (A) and non-native grassland is indicated by (B) on the aerial plan sheet. The native mean wetness coefficient (W) is significantly less than zero. Eighty-five percent of the created wetland site (including the edge) is covered by persistent hydrophytic vegetation. The interspersion of water and vegetation was moderate. The east-central portion of the site is predominantly inundated and a few small, isolated areas of standing water exist.

Performance Standard 5

Relative importance value of native plants

The relative importance value of native plants (RIVn) is 67.9 (Appendix A, Table 2). This is a slight decrease from last year's RIVn of 71. The species having the highest importance values are *Eleocharis acicularis*, *Typha angustifolia, Echinochloa crusgalli* and *Eleocharis obstusa* (20.6, 16.7, 9.9, and 8.1, respectively) (Appendix A, Table 1). Of these, *Typha angustifolia* and *Echinochloa crusgalli* are non-native. Within the entire site, only seven out of 73 species are non-native (less than 10%). More than 50 are native perennial species (57%) and fewer than 50% of the species are annual (41%).

SUMMARY AND RECOMMENDATIONS

Results from the second monitoring year suggest that this site is continuing to develop into a fairly good quality wetland. The site currently meets performance standards 4 and 7, and partially meets the requirements of performance standards 1, 3, 8, and 9. Wetland hydrology is established and hydric soils are present. Interspersion of water and vegetation is moderate and the mean wetness coefficient is less than zero. Hydrophytic vegetation dominates and only six of the seventy-four species present are non-native. Both the naturally occurring and the planted vegetation are doing well. Floristic quality is fairly high for a two year old site (FQI = 24.3, mean C = 3.0). The created wetland supports 95% total vegetation cover (5% bare ground). Native, perennial species account for 57% of that coverage and annual species account for only 41%. The site is probably too wet to develop a significant woody component. Although aerial coverage of woody vegetation has increased since last year (and will probably increase beyond it's current 9.5% level), it is very unlikely to reach 30% and most of the woody component is along the perimeter of the site (i.e., outside the wetland area). Although the planted seedling survival rate (37.5%) does not meet the performance standard (9), 75% survival is rather unrealistic. Additionally, if *Carya laciniosa* is excluded from calculations, (because it is uncertain whether this species was planted or why the survival was so low), average survival rate would be a very respectable 50%.

Despite the positive progress of this site, a number of performance standards (1, 2, 3, 5, 6, 8 and 9) may never be achieved. Currently, 2.75 ha (6.8 acres) of a total excavated area of 3.9 ha (9.6 acres) satisfies the wetland hydrology criteria. Without further excavation at the perimeter, an aerial wetland coverage of 4.1 ha (performance standard 1) will probably not be achieved. One serious problem that needs to be addressed quickly is the dense stand of narrow-leaved cattail (*Typha angustifolia*) which occupies approximately 20% of the created wetland. This species is very aggressive and persistent, may eventually dominate the entire site, and is in conflict with five of the site's eight performance standards. *Typha angustifolia* is non-native and

weedy, and tends to dominate the wetlands where is occurs (performance standard 6). This species tends to shade out and reduce the relative importance value of native wetland species and reduces floristic quality and diversity (performance standards 2,3, and 5). Narrow-leaved cattail is not a graminoid species, and its continued dominance will hinder the establishment of species typical of tall graminoid marshes (*Spartina pectinata, Scirpus validus, Scirpus americanus, Scirpus cyperinus, Carex lacustris*) (performance standard 8). Although the most dominant species (*Eleocharis acicularis)* and fourth most dominant species (*Eleocharis obtusa*) are considered graminoid, they are not tall. The aforementioned tall graminoid species (*Spartina*, etc.) need to be planted or seeded and the *Typha* population needs to be diminished for a tall graminoid marsh to be established. Management activities that will reduce the *Typha* population, such as prescribed burning and additional excavation, should be carried out. Also, without significant species additions, a mean C value of 3.5 will not be achieved (performance standard 2). The current mean C of 3.0 is more than adequate for a recently created wetland. Naturally occurring wetlands with mean C values of 3.5 are very uncommon. Although in a properly functioning wetland the FQI should generally increase over the first twenty years or so, at this site, the FQI may not increase each successive year. Also, at some point, the FQI will level off.

The relative importance value of native plants was 67.9. This is a slight decrease from last year's RIVn of 71, primarily because the RIV's of 3 non-native species (*Echinchloa crusgalli, Setaria glauca*, and *Setaria faberi*,) increased substantially. These species appear to have taken advantage of a drier year at the site (compared to 1999). The importance value of native plants should generally increase over time at a new site and *Eleocharis acicularis*, the most dominant species, was a good example of this. The RIV of this species increased from 15.94 in 1999 to 20.63. At this site, however, the RIV may not increase each successive year because the accomplishment of this performance standard (5) is also hindered by the dominance of *Typha* and by the fact that only 3 of the 51 species present were non-native to begin with (in 1999). Although the RIV of the non-native, weedy *Typha angustifolia* actually decreased since 1999 (from 21.72 to 16.67) (probably also due to decreased wetness), without management, it will be among the three most dominant species indefinitely (performance standard 6).

REFERENCES

Carr, K.W. and K.D. Weaver. 2000. Annual report for active IDOT wetland compensation and hydrologic monitoring sites. Illinois State Geological Survey, Champaign, IL.

Cox, G.W. 1985. Laboratory manual of general ecology. 5th ed. Wm. C. Brown Pu., Dubuque, IA. 248 pp.

Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi. Technical Report Y-87-1.

Federal Interagency Committee for Wetland Delineation. 1989. Federal manual for identifying and delineating jurisdictional wetlands. U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and U.S.D.A. Soil Conservation Service, Washington, D.C. Cooperative technical publication.

Fucciolo, C.S., J.J. Miner, S.E. Benton, D.B. Ketterling, and M.V. Miller. 1999. Annual water-level report for active IDOT sites. Illinois State Geological Survey, Champaign, IL.

LaTour, J.K., J.C. Maurer, and T.L. Wicker. 1995. Water Resources Data-Illinois, Water Year 1994. Volume 1-Illinois except Illinois River Basin. U.S. Geological Survey, Water Resources Division, Urbana, IL. USGS-WDR-IL-94-1. 233p.

Plocher, A.E., P. Tessene, and T. Brooks. 1995. Wetland mitigation site assessment for FAP 313 (U.S. 34), Henderson County, IL. Report submitted to the Illinois Department of Transportation. 22 pp.

Reed, P. B., Jr. 1988. National list of plant species that occur in wetlands: Illinois. U.S. Fish and Wildlife Service, National Wetlands Inventory. NERC-88/18.13.

Smith, R.L. 1980. Ecology and field biology. 3rd. ed. Harper and Row, New York, 835 pp.

Taft, J., D. Ladd, G. S. Wilhelm, and L. A. Wetstein. 1997. Floristic quality assessment database for the state of Illinois. Erigenia 15:3-97.

U.S. Department of Agriculture, Soil Conservation Service. 1956. Henderson County Soils. University of Illinois Agricultural Experiment Station Soil Report No. 77. 64 pp. + maps.

U.S. Department of Agriculture, Soil Conservation Service. 1987. Hydric soils of the United States. In cooperation with the National Technical Committee for Hydric Soils. USDA-SCS, Washington, DC. 21

Appendix A. Vegetation sampling results

Table 1. Vegetative cover, frequency, and importance value

Species	Total Cover (%)	Avg. % Cover per plot	Relative Cover (%)	Frequency	Relative Frequency (%)	Relative Importance Value
Eleocharis acicularis	1662.5	42.63	27.74	0.72	13.52	20.63
Typha angustifolia	1187.5	30.45	19.81	0.72	13.52	16.67
Echinochloa crusgalli	636.0	16.31	10.61	0.49	9.17	9.89
Eleocharis obtusa	485.0	12.44	8.09	0.44	8.21	8.15
Potamogeton nodosus	185.5	7.76	3.09	0.18	3.38	3.24
Lindernia dubia	97.5	2.50	1.63	0.23	4.35	2.99
Setaria faberi	133.5	3.42	2.23	0.15	2.90	2.56
Setaria glauca	177.5	4.55	2.96	0.10	1.93	2.45
Bidens cernua	113.5	2.91	1.89	0.15	2.90	2.40
Scirpus validus	160.0	4.10	2.67	0.08	1.45	2.06
Eleocharis erythropoda	97.5	2.50	1.63	0.13	2.41	2.02
Ammania coccinea	643.5	1.65	1.08	0.15	2.90	1.99
Nymphaea odorata	150.5	3.86	2.51	0.08	1.45	1.98
Ambrosia artemisiifolia	93.0	2.38	1.55	0.10	1.93	1.74
Polygonum punctatum	81.0	20.8	1.35	0.10	1.93	1.64
Pontedaria cordata	122.5	3.14	20.4	0.05	0.97	1.50
Solidago gigantea	58.5	1.50	0.98	0.10	1.93	1.45
Cyperus acuminatus	48.0	1.23	0.08	0.10	1.93	1.37
Acer saccharinum	15.0	0.38	0.25	0.13	2.41	1.33
Solidago canadensis	100.0	2.56	1.37	0.05	0.97	1.32
Polygonum pensylvanicum	21.0	0.54	0.35	0.08	1.45	0.90
Populus deltoides	21.0	0.54	0.35	0.08	1.45	0.90
Alisma plantago-aquatica	9.0	0.23	0.15	0.08	1.45	0.80
Ludwigia alternifolia	9.0	0.23	0.15	0.08	1.45	0.80
Lemna minor	9.0	0.23	0.15	0.08	1.45	0.80
Elodea canadensis	62.5	1.60	1.04	0.03	0.48	0.76
Panicum dichotomiflorum	30.0	0.77	0.50	0.05	0.97	0.73
Cyperus strigosus	18.0	0.46	0.30	0.05	0.97	0.63
Bidens connata	18.0	0.46	0.30	0.05	0.97	0.63
Sagittaria latifolia	37.5	0.96	0.63	0.03	0.48	0.55
Erigeron annus	6.0	0.15	0.10	0.05	0.97	0.53
Penthorum sedoides	6.0	0.15	0.10	0.05	0.97	0.53
Leersia oryzoides	6.0	0.15	0.10	0.05	0.97	0.53
Rumex crispus	6.0	0.15	0.10	0.05	0.97	0.53
Scirpus fluviatilis	15.0	0.38	0.25	0.03	0.48	0.37
Conyza canadensis	15.0	0.38	0.25	0.03	0.48	0.37
Cyperus erythrorhizos	15.0	0.38	0.25	0.03	0.48	0.37
Bidens aristosa	3.0	0.08	0.05	0.03	0.48	0.27
Amaranthus tuberculatus	3.0	0.08	0.05	0.03	0.48	0.27
Asclepias incarnata	3.0	0.08	0.05	0.03	0.48	0.27
Cyperus esculentus	3.0	0.08	0.05	0.03	0.48	0.27
Acalypha rhomboidea	3.0	0.08	0.05	0.03	0.48	0.27
Echinodorus berteroi	3.0	0.08	0.05	0.03	0.48	0.27
Rumex verticillatus	3.0	0.08	0.05	0.03	0.48	0.27

Table 2. Summary: Native and non-native species

Species	Frequency	% Relative Frequency	Avg. % Cover per plot	% Relative Cover	Relative Importance Value
Native	3.79	71.5	98.8	64.3	67.9
Non-native	1.52	28.5	54.9	35.7	32.1
All	5.31	100	153.7	100	100

Appendix B. Routine Wetland Determination form

Routine On-site Wetland Determination
Site 1 (page 1 of 4)

Field Investigators: Cooprider, Tessene, Feist
Date: 16 August 2000
Contract Number: 88516
Project Name: FAP 313 (U.S. 34)
State: Illinois **County:** Henderson **Applicant:** IDOT District 4
Site Name: Marsh
Legal Description: NE1/4 NE 1/4 SW 1/4 sec. 34 T.10N. - R.6W.
Location: Begins approximately 23 m (75 ft) north of U.S 34, 91 m (300 ft) east of an excavated lake in Gulfport, and south of Crystal Lake.

Do normal environmental conditions exist at this site? Yes: X No:
Have the vegetation, soils and/or hydrology been significantly disturbed? Yes: No: X

VEGETATION

Dominant Plant Species	Indicator Status	Stratum
Echinchloa crusgalli	OBL	herb
Eleocharis acicularis	OBL	herb
Eleocharis obtusa	OBL	herb
Typha angustifolia	OBL	herb

Percentage of plant species that are OBL, FACW, FAC+, or FAC: 100%
Hydrophytic vegetation? Yes: X No:
Rationale: More than 50% of the dominants are OBL, FACW, FAC+ or FAC.

SOILS

Series and phase: Sawmill silty clay (Cumulic Endoaquoll)
On Henderson County hydric soils list? Yes: X No:
Is the soil a histosol? Yes: No: X
Histic epipedon present? Yes: No: X
Redox concentrations: Yes: X No: Redox depletions: Yes: No: X
Matrix color: 2.5Y 5/1 Redox color: 7.5YR 5/8
Other indicators: surface saturation

Hydric soils? Yes: X No:
Rationale: This soil has an iron depleted matrix with common, prominent iron masses throughout. It is poorly drained and exhibits characteristics of the Sawmill series with the mollic epipedon removed during excavation.

Routine On-site Wetland Determination
Site 1 (page 2 of 4)

Field Investigators: Cooprider, Tessene, Feist
Date: 16 August 2000
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HYDROLOGY

Inundated? Yes: X (in places) No: Depth of standing water: up to 0.13 m (5 in)
Depth to saturated soil: 0-0.6 m (0-24 in)
Overview of hydrological flow through the system: This site is located in an excavated area that is affected by the Mississippi River via water table fluctuations and occasional to rare flooding. Normal hydrologic inputs include precipitation and sheet flow from higher ground. Evapotranspiration is a hydrologic output.
Size of watershed: approximately 259,000 km^2 (100,000 mi^2) (est. from 119,000 m^2 drainage area at Keokuk, IA)
Other field evidence observed: water scouring (areas bare of vegetation)

Wetland hydrology? Yes: X No:
Rationale: Observation of inundation, location in an excavated area, and field indicators of wetland hydrology suggest that this site is inundated for a significant duration during the growing season.

DETERMINATION AND RATIONALE

Is this site a wetland? Yes: X No:
Rationale for decision: This site has hydrophytic vegetation, hydric soils, and wetland hydrology. The NWI does not classify this site as a wetland.

Determined by: Mary Cooprider (soils and hydrology)
Paul Tessene and Mary Ann Feist (vegetation and hydrology)
Illinois Natural History Survey
Center for Wildlife Ecology
607 East Peabody Drive
Champaign, Illinois 61820
(217) 333-6560 (Cooprider)

Species list can be found in Appendix C.

Appendix C. Species list 2000

Scientific name	Common name	Stratum	Wetland Indicator	C*
Acalypha rhomboidea◊	three-seeded mercury	herb	FACU	0
Acer saccharinum	silver maple	herb	FACW	1
Alisma plantago-aquatica	water plantain	herb	OBL	2
Amaranthus tuberculatus◊	water hemp	herb	OBL	1
Ambrosia artemisiifolia◊	common ragweed	herb	FACU	0
Ammania coccinea◊	scarlet loosestrife	herb	OBL	5
Asclepias incarnata	swamp milkweed	herb	OBL	4
Bidens aristosa◊	swamp marigold	herb	FACW	1
Bidens cernua◊	nodding bur-marigold	herb	OBL	2
Bidens connata◊	purplestem beggar-ticks	herb	OBL	2
Carex annectens	small yellow fox sedge	herb	FACW	3
Carya illinoensis[P]	pecan	seedling, shrub, sapling	FACW	6
Cassia fasciculata◊	partridge pea	herb	FACU-	1
Conyza canadensis◊	horseweed	herb	FAC-	0
Cyperus acuminatus◊	taperleaf flat sedge	herb	OBL	2
Cyperus erythrorhizos◊	red-rooted sedge	herb	OBL	1
Cyperus esculentus	yellow nutsedge	herb	FACW	0
Cyperus strigosus	straw nutsedge	herb	FACW	0
Echinochloa crusgalli◊	barnyard grass	herb	OBL	**
Echinodorus berteroi	lance-leaved burhead	herb	OBL	6
Eleocharis acicularis	spike rush	herb	OBL	3
Eleocharis erythropoda	spike rush	herb	OBL	3
Eleocharis obtusa◊	spike rush	herb	OBL	2
Elodea canadensis[P]	Canada water-weed	herb	OBL	5
Epilobium coloratum	cinnamon willow herb	herb	OBL	3
Erechtites hieracifolia◊	fire weed	herb	FACU	2
Erigeron annuus◊	daisy fleabane	herb	FAC-	1
Eupatorium serotinum	late boneset	herb	FAC+	1
Gratiola neglecta◊	clammy hedge hyssop	herb	OBL	5
Geum laciniatum	rough avens	herb	FACW	2
Hypericum mutilum	dwarf St. John's-wort	herb	FACW	5
Hypericum punctatum	spotted St. John's-wort	herb	FAC+	3
Ipomoea lacunosa◊	small white morning-glory	herb	FACW	1
Iris shrevei[P]	blue flag iris	herb	OBL	5
Leersia oryzoides	rice cutgrass	herb	OBL	3
Lemna minor◊	duckweed	herb	OBL	3
Leptochloa sp. ◊	sprangle-top	herb	-----	--
Lindernia dubia◊	false pimpernel	herb	OBL	5
Lobelia cardinalis	cardinal-flower	herb	OBL	5
Ludwigia alternifolia	seedbox	herb	OBL	5
Ludwigia palustris americana	marsh purslane	herb	OBL	4
Lycopus americanus	common water horehound	herb	OBL	3
Lythrum alatum	winged loosestrife	herb	OBL	5
Melilotus alba ◊	white sweet clover	herb	FACU	**
Mimulus ringens	monkey flower	herb	OBL	5
Nuphar luteum[P]	yellow water lily	herb	OBL	6
Nymphaea odorata[P]	fragrant water lily	herb	OBL	6
Panicum dichotomiflorum◊	fall panic grass	herb	FACW-	0

Species list continues on next page...

Species list (continued)

Scientific name	Common name	Stratum	Wetland Indicator	C*
Penthorum sedoides	ditch stonecrop	herb	OBL	2
Polygonum amphibium	water smartweed	herb	OBL	3
Polygonum aviculare◊	knotweed	herb	FAC-	**
Polygonum erectum◊	erect knotweed	herb	FACU	0
Polygonum lapathifolium◊	nodding smartweed	herb	FACW+	0
Polygonum pensylvanicum◊	smooth smartweed	herb	FACW+	1
Polygonum punctatum	dotted smartweed	herb	OBL	3
Pontedaria cordata◊ [P]	pickerel weed	herb	OBL	8
Populus deltoides	cottonwood	herb, shrub,sapling	FAC+	2
Potamogeton nodosus [P]	pondweed	herb	OBL	7
Potentilla norvegica◊	rough cinquefoil	herb	FAC	0
Quercus bicolor [P]	swamp white oak	seedling, shrub	FACW+	7
Quercus palustris [P]	pin oak	seedling, shrub	FACW	4
Rumex crispus	curly dock	herb	FAC+	**
Rumex verticillatus	swamp dock	herb	OBL	5
Sagittaria latifolia	common arrowhead	herb	OBL	4
Salix amygdaloides	peachleaf willow	herb, shrub, sapling	FACW	4
Salix exigua	sandbar willow	herb, shrub,sapling	OBL	1
Scirpus fluviatilis	river bulrush	herb	OBL	3
Scirpus validus	soft-stemmed bulrush	herb	OBL	4
Setaria faberi ◊	giant foxtail	herb	FACU+	**
Setaria glauca ◊	pigeon grass	herb	FAC	**
Solidago canadensis	tall goldenrod	herb	FACU	1
Solidago gigantea	late goldenrod	herb	FACW	3
Typha angustifolia	narrowleaf cattail	herb	OBL	**
Verbena hastata	blue vervain	herb	FACW+	3

* Coefficient of Conservatism
Mean c value = $\sum C/N = 193/66 = 2.97$
◊ = annual or biennial species
[P] = planted

** Species not native to Illinois
$FQI = \overline{C}\sqrt{N} = 2.97\sqrt{66} = 24.3$

Without the planted species (*Carya illinoensis, Elodea canadensis, Iris shrevei, Nuphar luteum, Nymphaea odorata, Pontedaria cordata, Potamogeton nodosus, Quercus bicolor, and Quercus palustris*):

Mean c value = $\sum C/N = 139/57 = 2.44$

$FQI = \overline{C}\sqrt{N} = 2.44\sqrt{58} = 18.58$

Scirpus validus and *Sagittaria latifolia* were also planted, but naturally occuring individuals were also present.

Appendix D: Aerial Extent of Wetland Hydrology

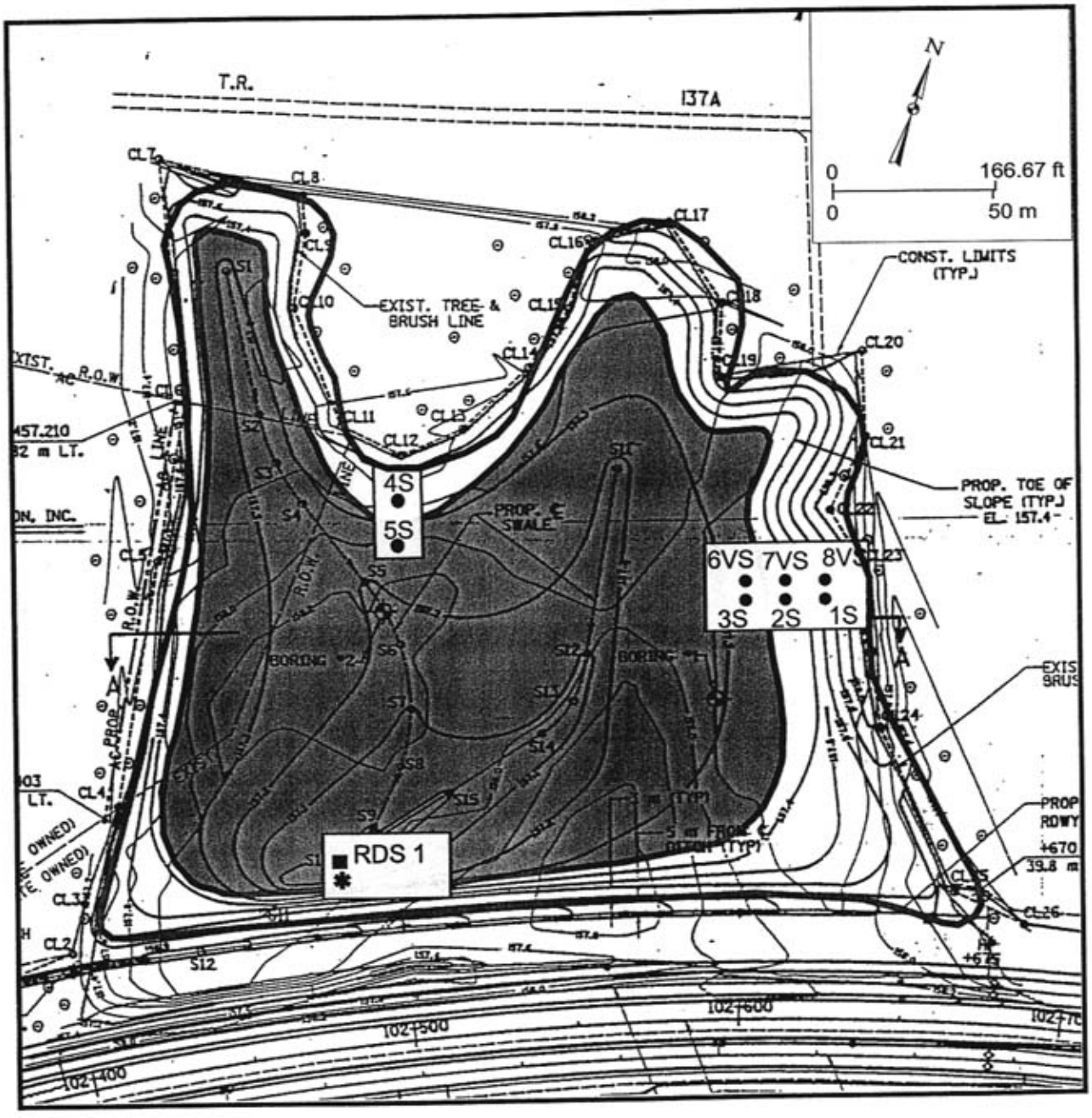
Gulfport Wetland Compensation Site

(FAP 313)

Estimated Areal Extent of 2000 Wetland Hydrology

based on data collected between September 1, 1999 and September 1, 2000

map based on pre-construction plans received from IDOT (date unknown)



estimated areal extent of 2000 wetland hydrology

estimated areal extent of IDOT excavation

● monitoring well

■ RDS data logger

✱ rain gauge

Appendix E. Photographs from permanent photograph stations.

Figure 1. Photo station 1, N/NW

Figure 2. Photo station 2,N/NW

Figure 3. Interior of wetland, NW

Figure 4. Photo station 3, N/NW

Figure 5. Photo station 4, W/SW

Figure 6. Photo station 5, W/SW

Figure 7. Photo station 6, N/NW

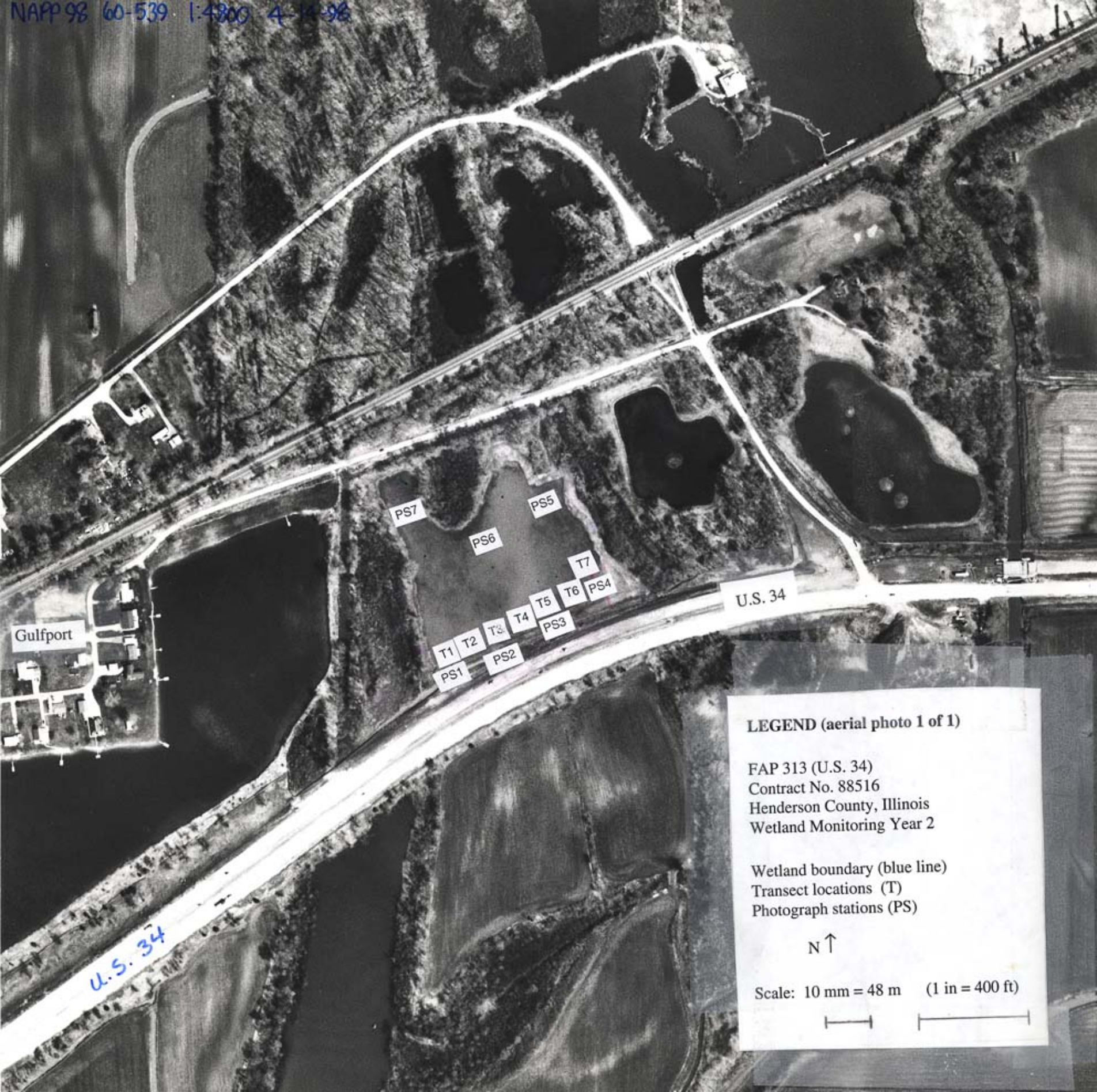
Figure 8. Photo station 7, N/NW

Figure 9. *Quercus bicolor* (swamp white oak), NW edge of site

Figure 10. *Carya illinoensis* (pecan), NW corner of site

Figure 11. *Lobelia cardinalis* (cardinal flower), NW edge of site

Figure 12. *Quercus palustris* (pin oak), southern edge of site


NAPP 98 60-539 1:4800 4-14-98
PS7
PS5
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PS2
PS1
U.S. 34
Gulfport
U.S. 34
LEGEND (aerial photo 1 of 1)
FAP 313 (U.S. 34)
Contract No. 88516
Henderson County, Illinois
Wetland Monitoring Year 2
Wetland boundary (blue line)
Transect locations (T)
Photograph stations (PS)
N
Scale: 10 mm = 48 m (1 in = 400 ft)